UNITED STATES PATENT AND TRADEMARK OFFICE

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10/594,254	09/25/2006	Marion Jeanne	5284-81PUS	1875

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01 March 2010</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,3,4,7-11 and 14</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,3,4,7,8,10,11,14</u> is/are rejected.

7)☒ Claim(s) <u>9</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to communication filed on 3/01/2010.

Claims 2, 5,6,12, and 13 have been cancelled. Claims 1, 3, 4, 7-11, 14 have

been amended and are pending in this application.

Response to Arguments

2.   Applicant's arguments with respect to the claims have been considered but are

moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1,3,4,7 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Jeanne et al. "Source and Joint Source-channel decoding of variable length codes"

Re claim 1, Jeanne discloses a method of combined source-channel decoding of

digital data coding discrete values or symbols (i, j, etc.) received by an input

convolutional channel decoder (*DEC1*) of a digital data turbodecoder decoder (50) from

a source over a transmission channel, the method comprising the steps of *(fig.3 and fig.4):*

applying a priori probabilities *(equation 1 and 2 are derived from the tree of "VLC" variable length codes and are the a priori bit probabilities. "page 768; Section II a priori bit probability in VLCs; and top left column of page 769)* associated with said symbols to a channel decoding trellis *(decoder on the reduced binary trellis of fig.1; using the derived a priori bit probabilities (equation 1 and 2) to generate the reduced binary Trellis "page 769; Section III Trellis representation o VLCs.Thus providing a priori bit probabilities associated said symbols to decode using trellis decoder. Furthermore , fig.4 discloses DEC2 as being decoding trellis; page 771; Section A.1 independent source right third column)* ; and

statistically estimating *(using APP "a posteriori probability" algorithm to statistically estimate of the turbo decoder; equation 12; page 771; Section A.1 independent source right column)* at each iteration of the turbo-decoder *(fig.3 shows at least 3 iterations performed by turbo decoder using the a priori source information and its comparison to without a priori information)*, said a priori probabilities from occurrences of the symbols estimated by said turbodecoder *(fig.4 shows turbo decoding with a priori probability);* does not explicitly disclose input convolutional channel decoder.

Instead, Jeanne discloses turbo decoding with recursive systematic code that requires computation of extrinsic information for each bit.

(see **6,128,765**, col. 2 lines 7-11, *decoding with recursive systematic*

convolutional codes, which are typically utilized in turbo coding and **6,812,873,**

col. 12 lines 63-65, where *Siohan* discloses "*It must be noted that the general decoding*

scheme of the turbo-codes is the same, whether block turbo-codes or convolutional

turbo-codes are used".

Therefore, it would have been rendered obvious to one skilled in the art to utilize

Jeanne's turbo decoding *(DEC 1)* for the benefit of improving the decoding process.

Re claim 3, the combined decoding method according to claim 1,

wherein said a priori probabilities are probabilities (p(i)) of occurrences of the symbols

(equation 1 and 2 are the a priori bit probabilities. "page 769; Section II a priori bit

probability in VLCs; top left column)

Re claim 4, the combined decoding method according to claim 1,

wherein said a priori probabilities are probabilities (p(i/j)) of transitions between the

symbols *(page 771; Section A.1 independent source; right column equation 12)*.

Re claim 7, the combined decoding method according to claim 1, wherein said

symbols are coded by variable length codes (VLC) represented by a binary tree of finite

size and said a priori probabilities (p(i), p(i/j)) are associated with each branch of said

tree and applied to the corresponding stages of said channel decoding trellis *(page 769;*

Section III Trellis representation o VLCs discloses the steps of generating of binary

trellis with number of state using variable length codes (VLC) table. Furthermore, fig.3

shows the decoding on the reduced binary trellis).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 8, 10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over

<u>Garcia-Frias</u> et al. *"Joint turbo decoding and estimation of Hidden Markov Sources"* in

view of <u>Ceperkovic</u> et al. US 2006/0053004

Re claim 8, <u>Garcia-Frias</u> discloses a combined source-channel turbodecoder for

digital data *(fig.3)*, comprising:

an input convolutional channel decoder *(D_0)* adapted to receive digital data

transmitted from a source over a transmission channel *(AWGN channel; fig.1 shows*

joint source-channel coding of the transmitter and fig.2 shows the received coded

symbols) and coding discrete values or symbols *(page 1672;_; Section II, joint source-*

channel decoding method; left second column; the input and coded bits associated with

each branch are presented in fig.2) and a priori probabilities associated with said

symbols *(page 1672; Section A, Hidden Markov source block; right first column; the*

trellis branches has an associated the priori probabilities are obtained from hidden

Markov model) ;

an output convolutional channel decoder *(D₁;page 1672; Section II, joint source-channel decoding method; left bottom column)*;

means for calculating said a priori probabilities (p(i), p(i/j)) associated with said estimated symbols *(page 1672; Section II, joint source-channel decoding method; left column)*; and

means for applying said a priori probabilities to a channel decoder trellis of the input convolutional channel decoder *(D₀;page 1675; Section A, the Buam-Welch algorithm and its relation to turbo decoding; left third column; information including a priori probability generated from previous decoder (e.g. D₁ decoder as shows in fig.3 where feedback information to convolutional channel decoder D₀;see also page 1673; Section B. constituent decoder blocks)*; does not teach a generator of histograms of occurrences of the symbols estimated by the output convolutional channel decoder.

However, Ceperkovic discloses fast adaptive histogram, where the probability of estimation of occurrence of symbol [para#153].

Therefore, taking the combined teaching of *Garcia-Frias* and Ceperkovic as a whole would have been rendered obvious to one skilled in the art to modify *Garcia-Frias* to utilize Ceperkovic's fast adaptive histogram for the benefit of finding a bit code more efficiently if the priori of symbol occurrence is available [para#17].

Re claim 10, the modified invention as claimed in claim 8, wherein said a priori probabilities are probabilities (p(i)) of occurrences of the symbols *(page 1672; Section A, Hidden Markov source block; right column)*.

Re claim 11, the modified invention as claimed in claim 8, wherein said a priori

probabilities are probabilities (p(i/j)) of transitions between the symbols (*page 1675;*

Section A, the Buam-Welch algorithm and its relation to turbo decoding; left third

column)

7.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over <u>Garcia-</u>
<u>Frias</u> et al. *"Joint turbo decoding and estimation of Hidden Markov Sources"* in view of

<u>Ceperkovic</u> et al. US 2006/0053004 in further view of <u>Jeanne</u> *et al. "Source and Joint*

Source-channel decoding of variable length codes"

        Re claim 14, the modified invention of Garcia-Frias and Ceperkovic as claimed in

claim 8 failed to teach Wherein symbols are coded by variable length codes (VLC)

represented by a binary tree of finite size.

        In the same field of endeavor, however, <u>Jeanne</u> discloses symbols are coded by

variable length codes (VLC) represented by a binary tree of finite size trellis *(page 769;*

Section III Trellis representation o VLCs discloses the steps of generating of binary

trellis with number of state using variable length codes (VLC) table).

        Therefore, taking the combined teaching of <u>Garcia-Frias ,Ceperkovic and Jeanne</u>

as a whole would have been rendered obvious to one skilled in the art to modify <u>Garcia-</u>
<u>Frias and Ceperkovic</u> to utilize <u>Jeanne 's</u> variable length codes (VLC) represented by a

binary tree of finite size trellis for the benefit of determining the exact location each bit of the tree *(page 769; Section II a priori bit probability in VLCs, top left column)*.

Allowable Subject Matter

8.   Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAHEL GUARINO whose telephone number is (571)270-1198. The examiner can normally be reached on M-F (9-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rahel Guarino/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611